Energy Saving Trust Domestic Small-Scale Wind Field Trial

International Small Wind Conference
27th April 2010

Anthony Kyriakides
Manager, Scottish Renewables

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Agenda

The Energy Saving Trust

Domestic small-scale wind field trial

Informing policy and certification

Future Plans – working with industry

The Energy Saving Trust

Our Mission - **To lead 60 million citizens to act on climate change**

Established in 1992, Scottish office from 1998

A private not-for-profit membership company, with members from the public and private sectors

Largely Government funded

Offices in Scotland, England, Wales and Northern Ireland

UK-wide and country specific activities

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Partners

Households

Supply Chain

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Local Authorities

Communities

Low Carbon Technologies

Advice – consumer, community, public sector, small business

Housing programme

- Refurbishment guides
- Advice to builders and developers

Financial incentive programmes

Technology monitoring

- Micro-wind
- Heat pumps
- Solar water heating
- Condensing boilers
- LED lighting
- Heating controls
- Insulation

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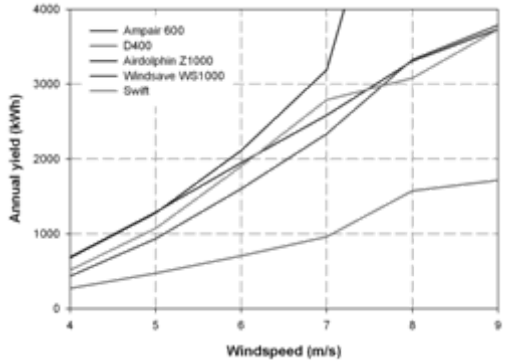
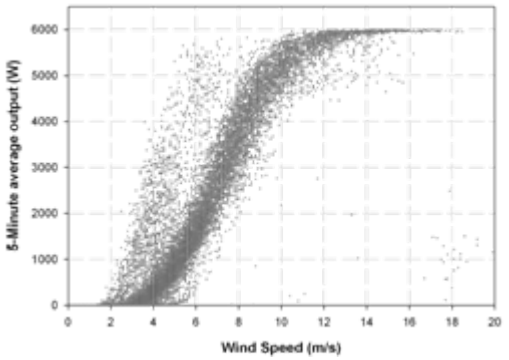
Domestic small-scale wind field trial - Objectives

- Are manufacturer's power curves realistic?
- What is actual site performance?
  - Influence of turbulence
  - Turbine position
- Annual load factors
- Accuracy of wind speed prediction tools
- Economics
- *To inform general public, consultants, planners, and the wind industry*





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Partners

EDF Energy

RWE npower

NIE Energy

Centrica plc

ScottishPower Ltd

Scottish and Southern Energy plc

E.ON Engineering Ltd

The Scottish Government

The Department for Energy and Climate Change

B&Q plc

The University of Southampton

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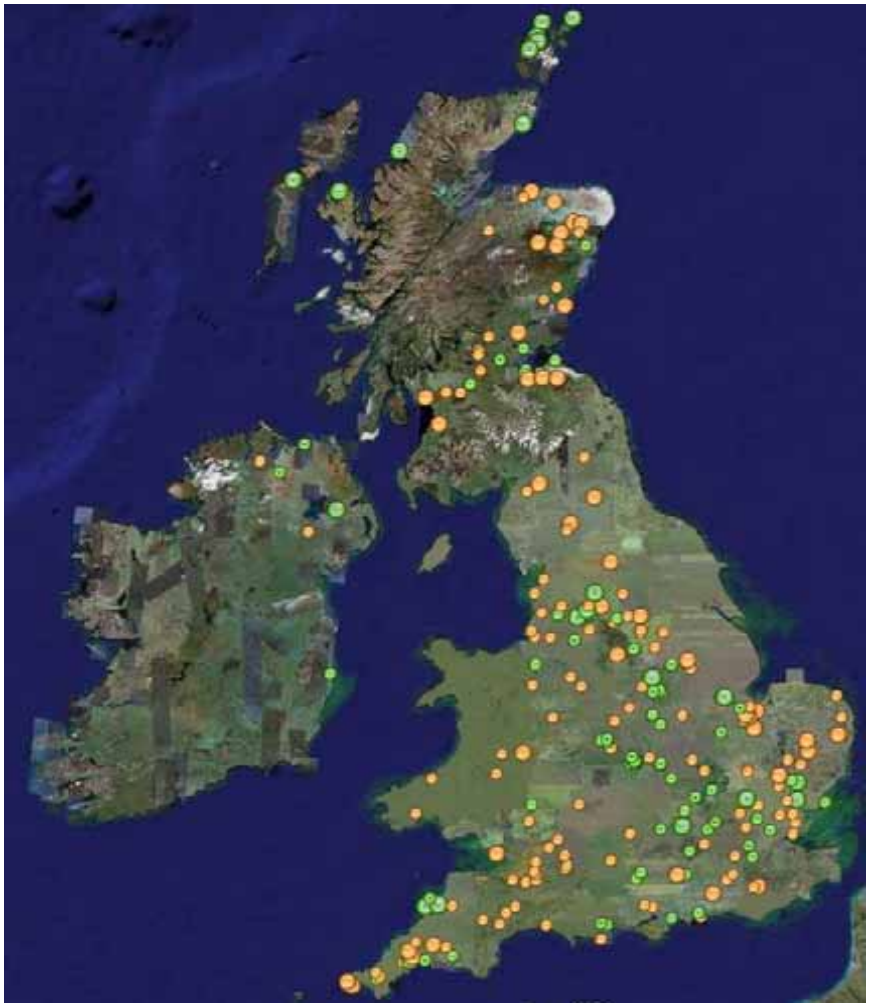
UK Sample

154 sites UK wide

Green circles:
57 full trial sites

Orange circles:
97 meter reading-only sites



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Turbine	EST Full Trial	WWT + Meter Reading(29+68)	Diameter (m)	Rated Power (W)	Rated wind speed (m/s)	Cut in wind speed (m/s)
Building mounted turbines						
Air dolphin	1	4+0	1.8	1000	12	2.5
Ampair 600	0	14+0	1.7	600	12.5	3.5
Eclectic, D400	0	4+0	1.1	400	15.5	2.5
Swift	4	1+0	2.1	1500	12.5	2.3
Windsave, WS1000	33	6+0	1.75	1000	12.5	4.5
Free standing, pole mounted turbines						
Eoltec	5	0+0	5.6	6000	11.5	2.7
Iskra AT5-1	6	0+1	5.4	5000	11	3
Proven 2.5	3	0+0	3.5	2500	12	2.5
Proven 6	5	0+17	5.5	6000	12	2.5

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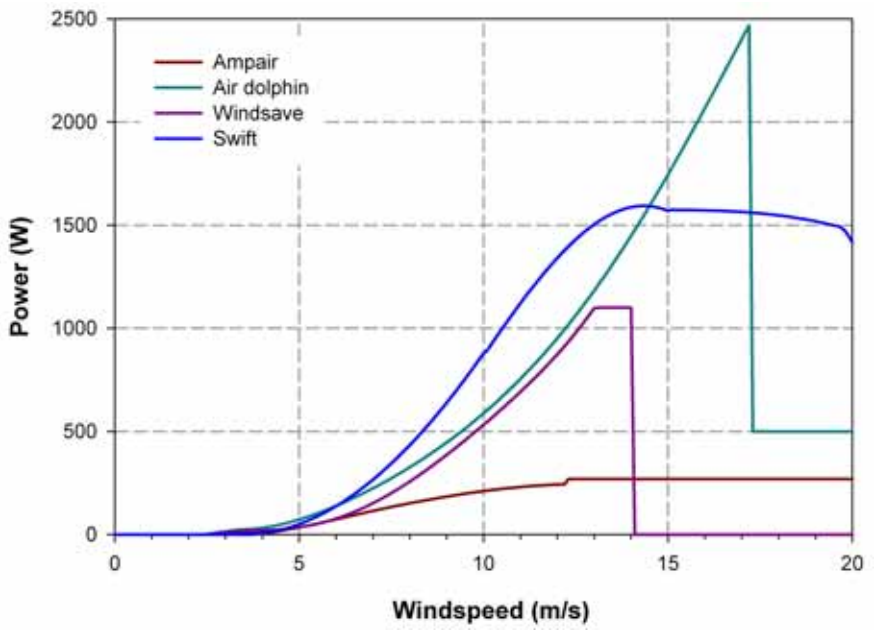
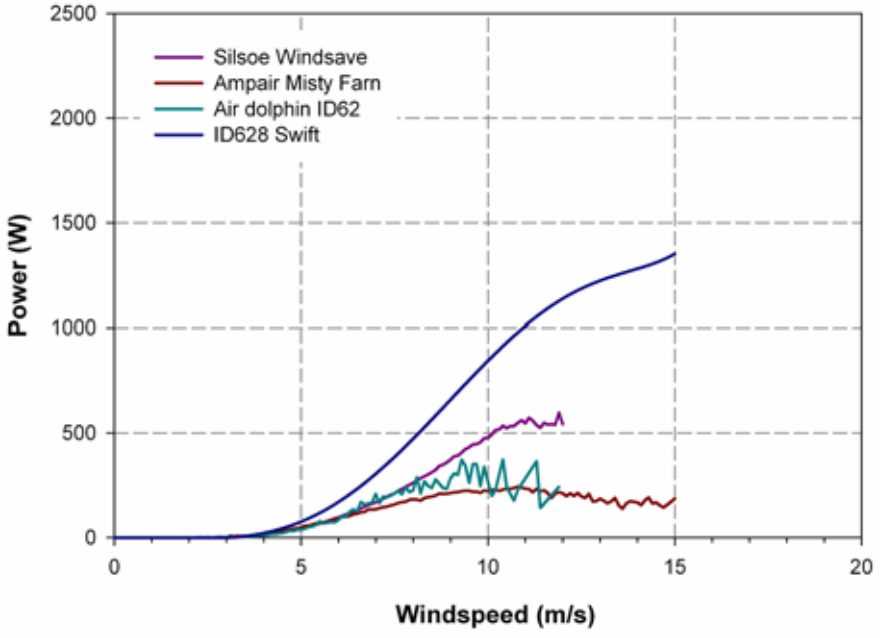
Power Curves – Building Mounted Turbines



Manufacturers' predicted



EST measured

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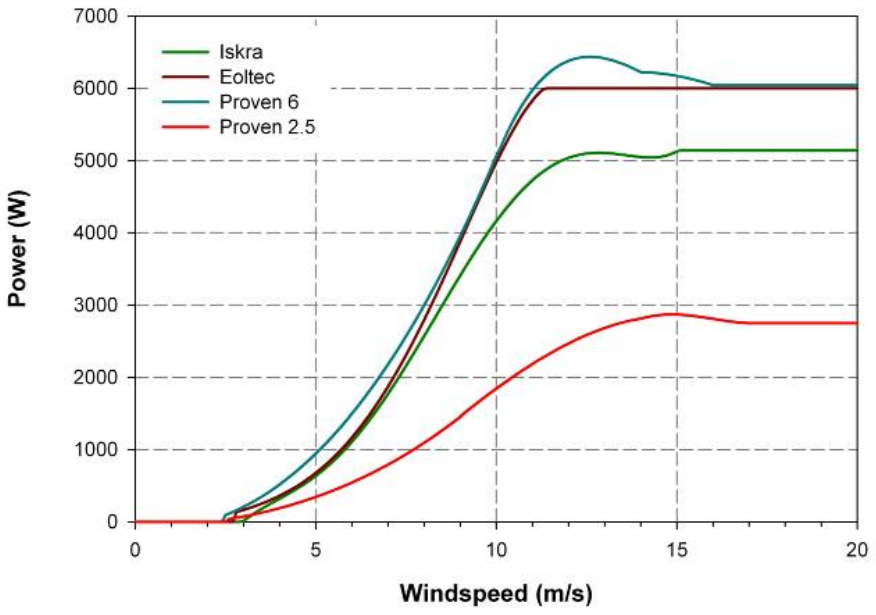
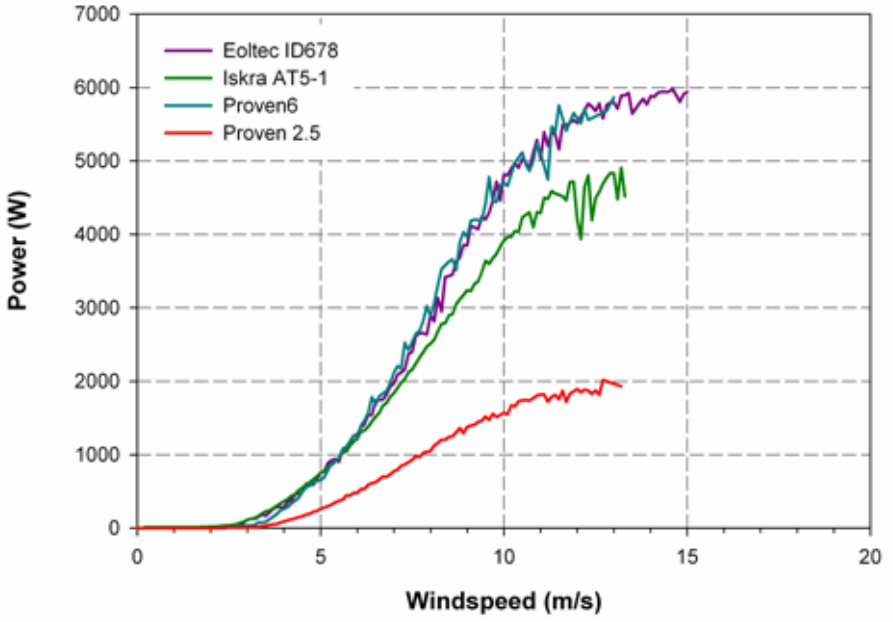
Power Curves – Free Standing Turbines





Manufacturers' predicted

EST measured

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Predicting Performance

Different ways of measuring performance

1) Capacity factor / Load factor

Commonly-quoted figures for small wind:

- 10% (building mounted)
- 17% (free standing)

DTI reported av. for large scale onshore wind of 28.2% in 2005

2) kWh/m2 swept area

3) Annual energy yield (kWh)

- Capacity Factor (% / 100) x rated power (kW) x no. hours in year

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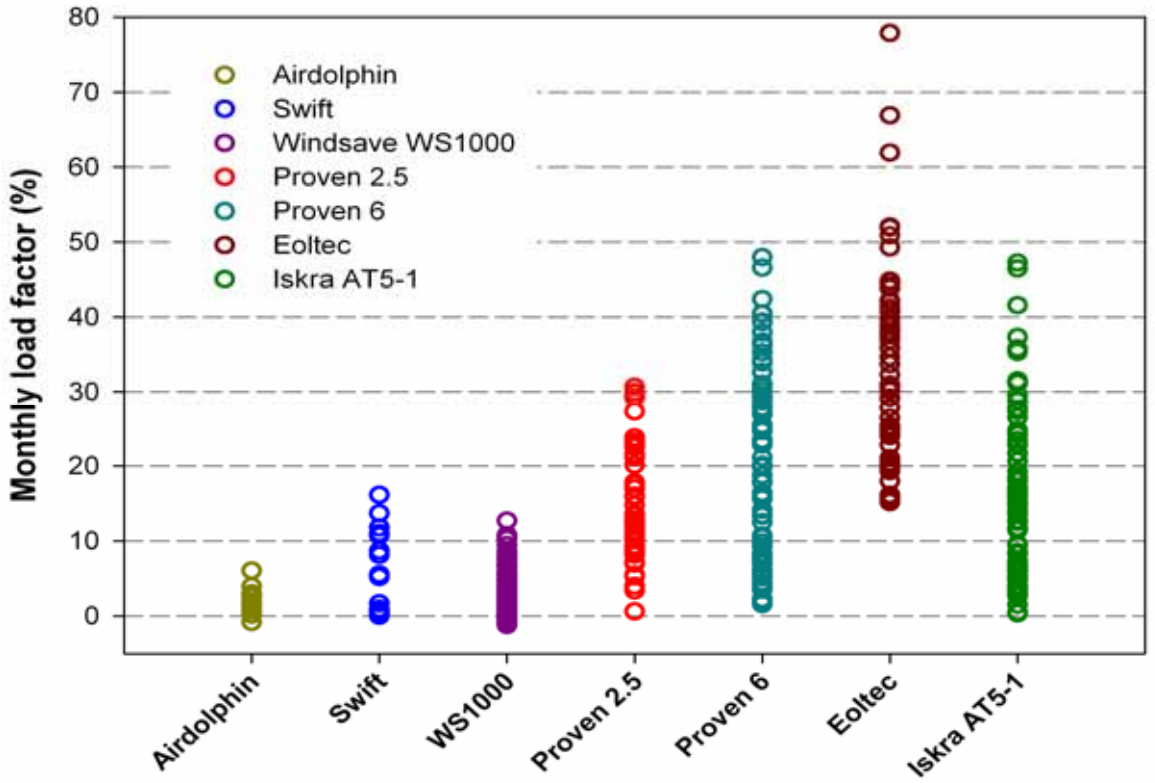
Capacity Factors

Measured average figures

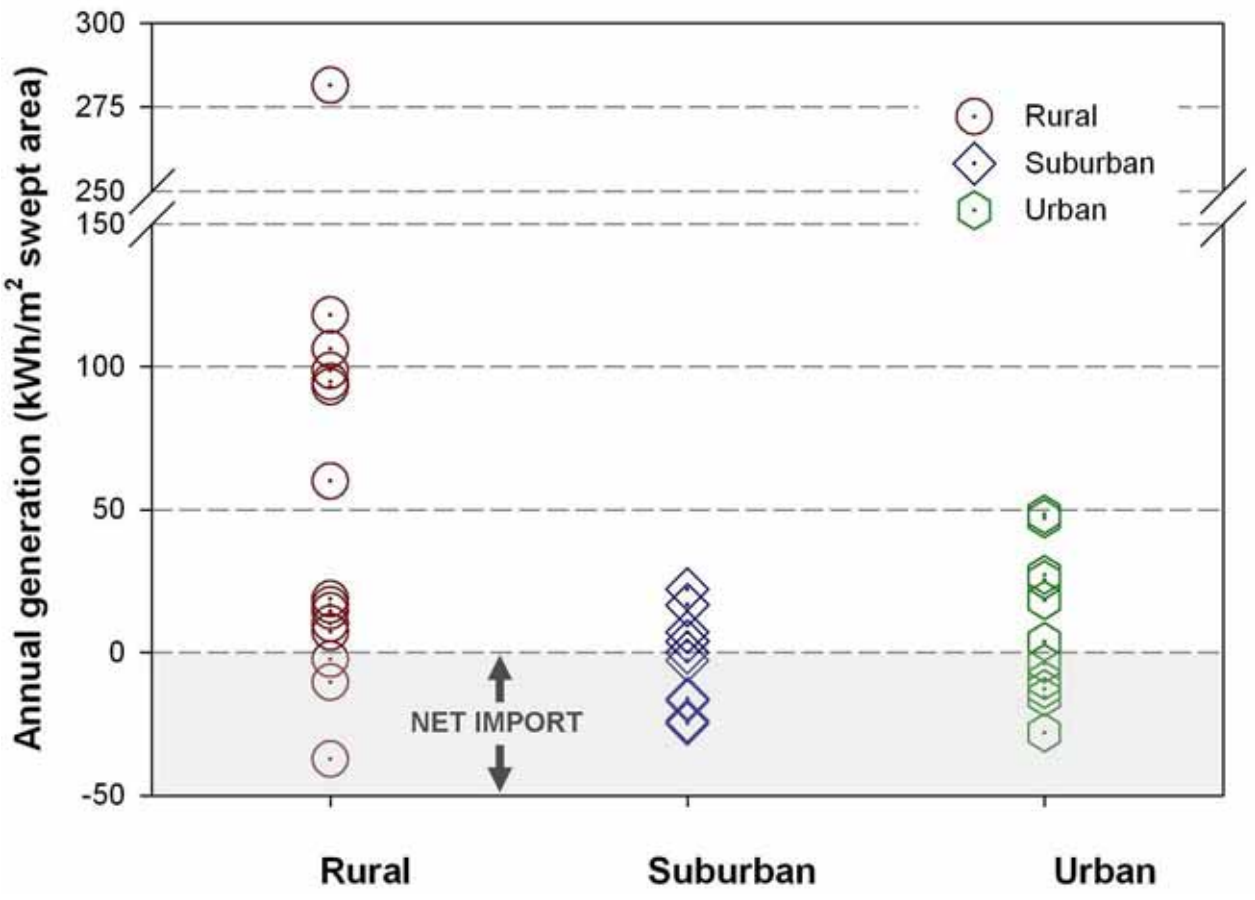
3% (building mounted) - 19% (free standing)



Building mounted turbines ← → **Free standing turbines**

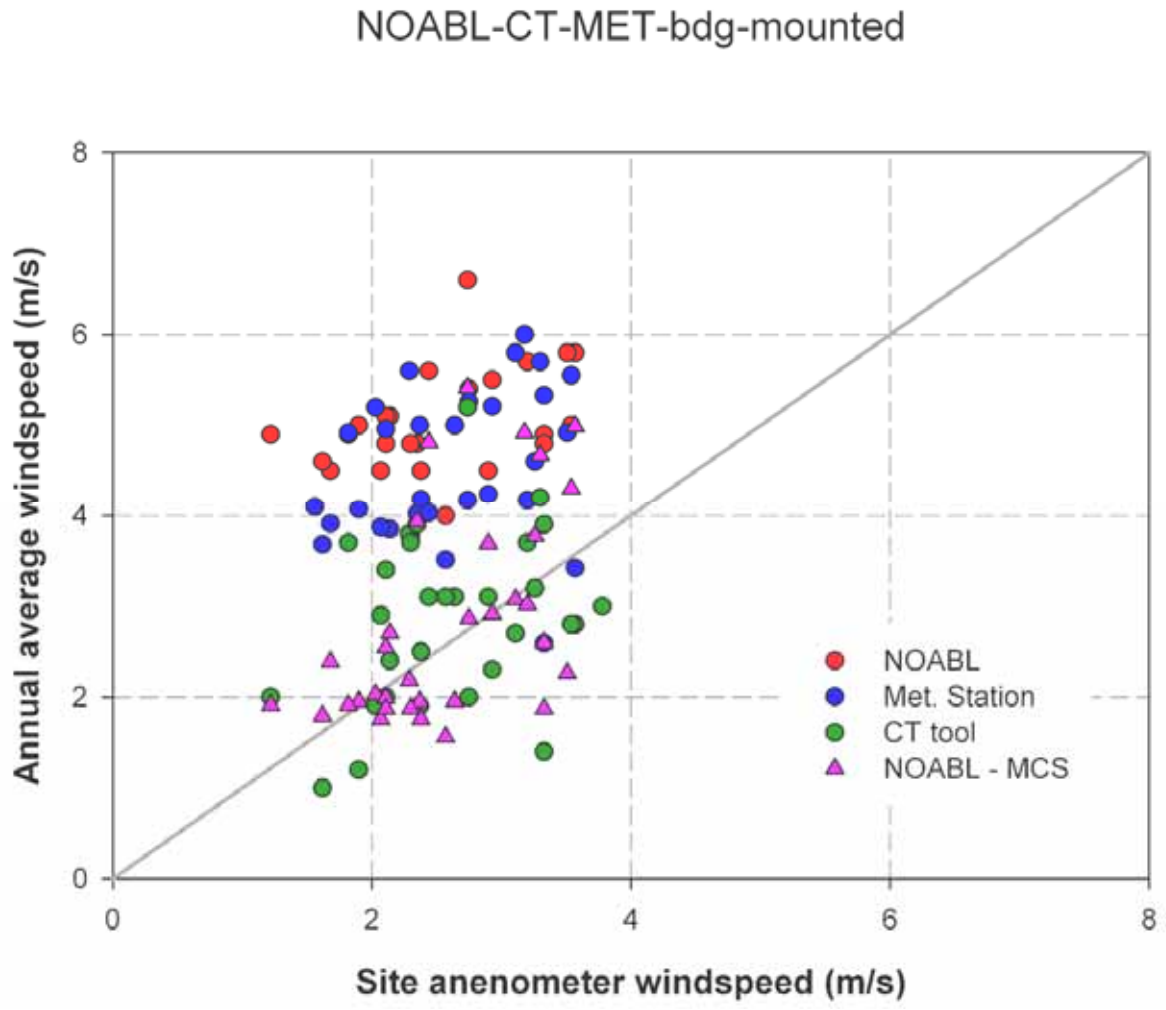
Annual Generation – Building Mounted

(kWh/m2 swept area)



Predicting Wind Speed

Building mounted turbines



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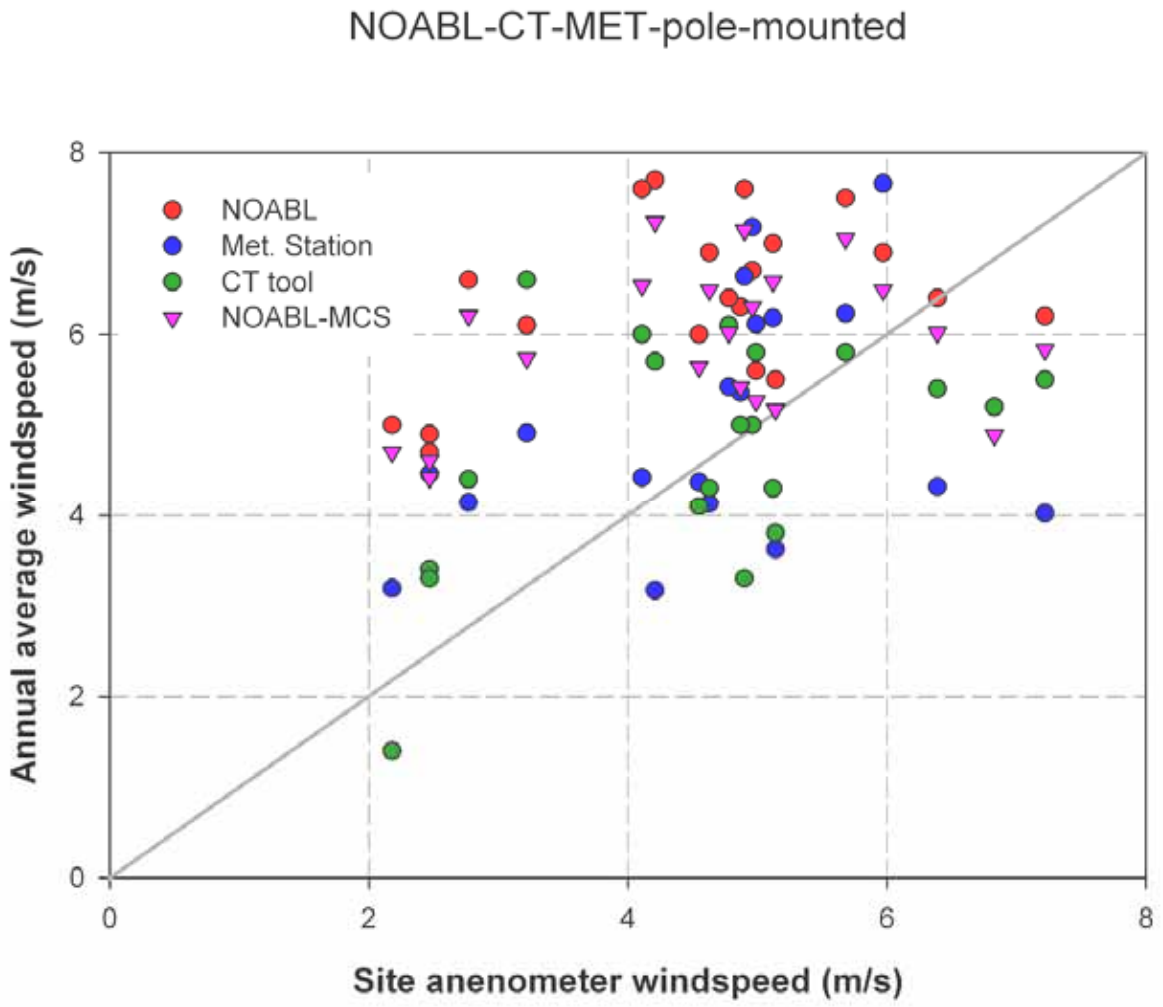
Predicting Wind Speed

Free standing turbines



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Betz Constant

Power Curves

Cut-in Speed

Swept Area

Inverter

Weibull Diagrams

Canopy Height

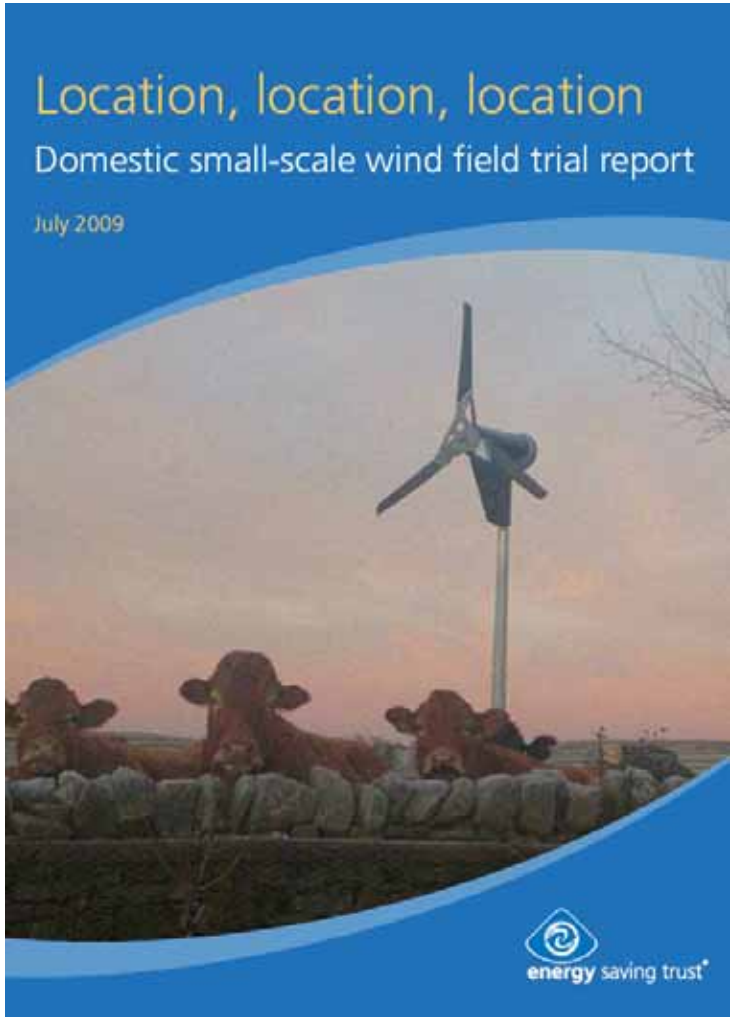
Horizontal/Vertical Axis

NOABL

Wind Rose

Field Trial Public Report

- Launched 9th July 2009
- Consultation with industry
- Exclusive media story: BBC, Guardian and Scotsman
- Target audience – domestic consumers
- energysavingtrust.org.uk/ Generate-your-own-energy



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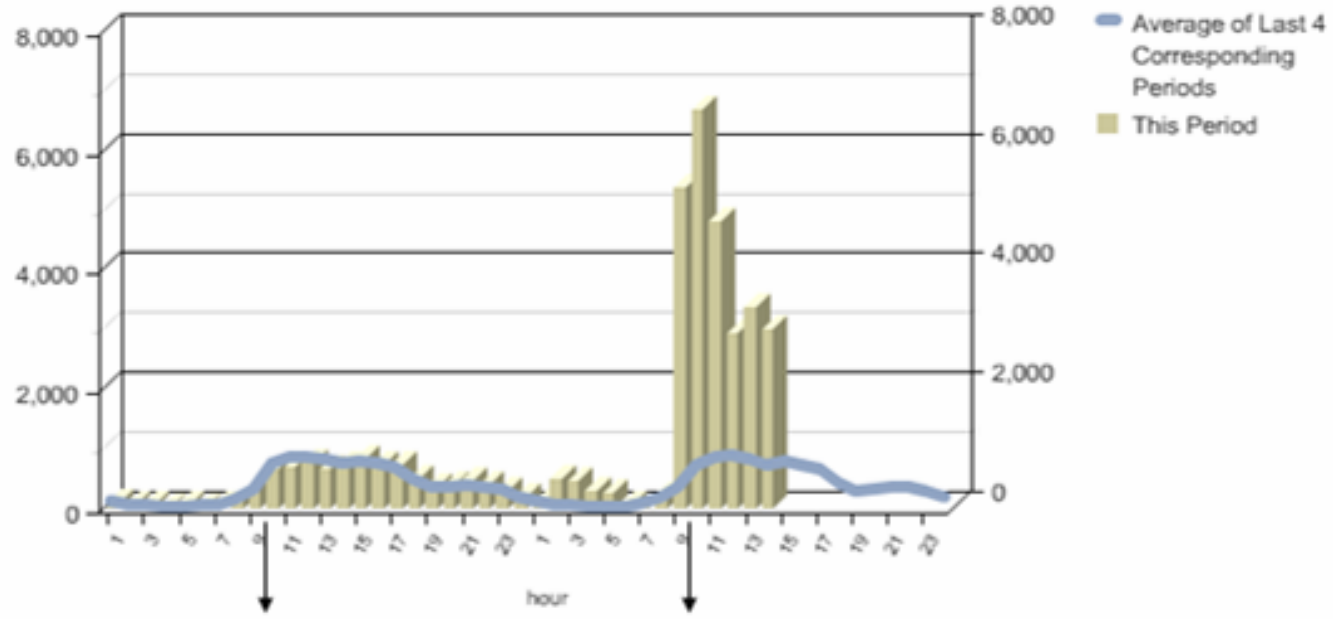
Media and Website

Unique visitors to Consumer channel Energy Saving Trust:

08/07 vs. 09/07



666 between 10-11am

6678 between 10-11am

Demonstrate the x10 uplift experienced on 9th July

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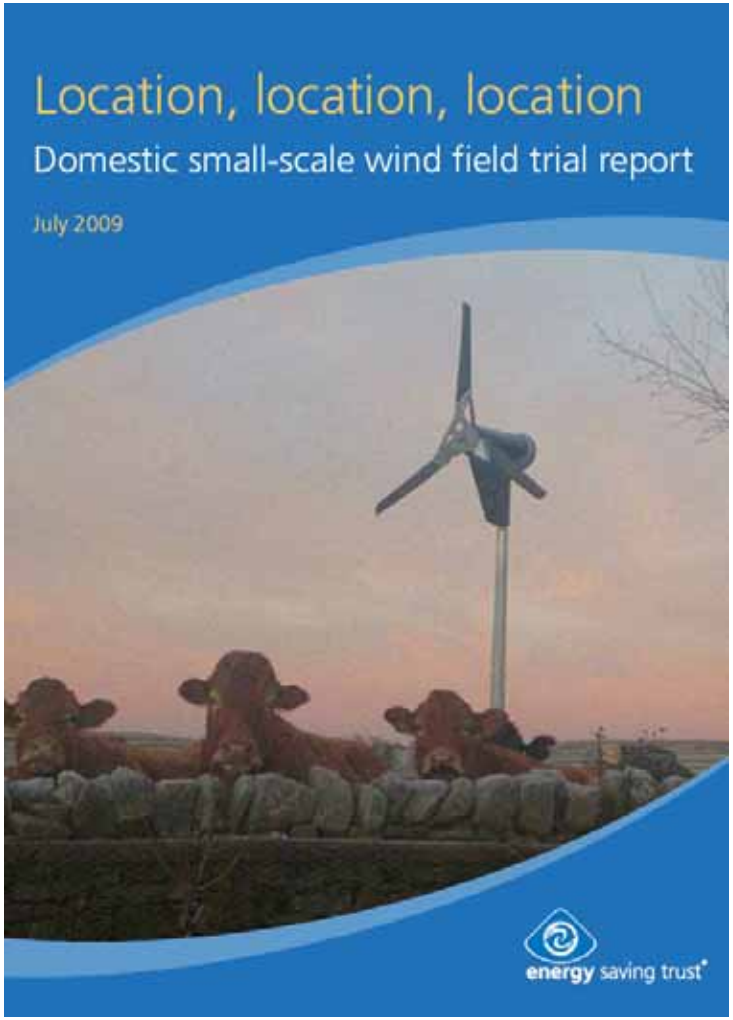
Report Conclusions

- Location, Location, Location
- Wind speed prediction is key
  - Anemometry desirable
- Standards needed - power curves / installation & product / MCS
- Good market potential in UK
  - Scotland particularly good
- 450,000 economic UK sites (pre feed-in tariffs)



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Customer Engagement

Energy Saving Scotland advice centres &

Energy Saving Trust advice centres

- 21 in total across UK
- 0800 512 012
- Micro renewables support and advice

Website tools and information

- Home energy generation selector
- Wind speed predictor
- Clean Energy Cashback calculator
- Technology information incl. videos & case studies
- Planning information

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Certification and Policy

MCS

- Installer & product standards

Ofgem

Gov grants and loans

CERT

FIT

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Working With Industry

Wind speed / direction data

- Turbulence study
- Turbine design

Equipment loan

- Monitor new sites, new products

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energysavingtrust.org.uk / generate-your-own-energy

0800 512 012

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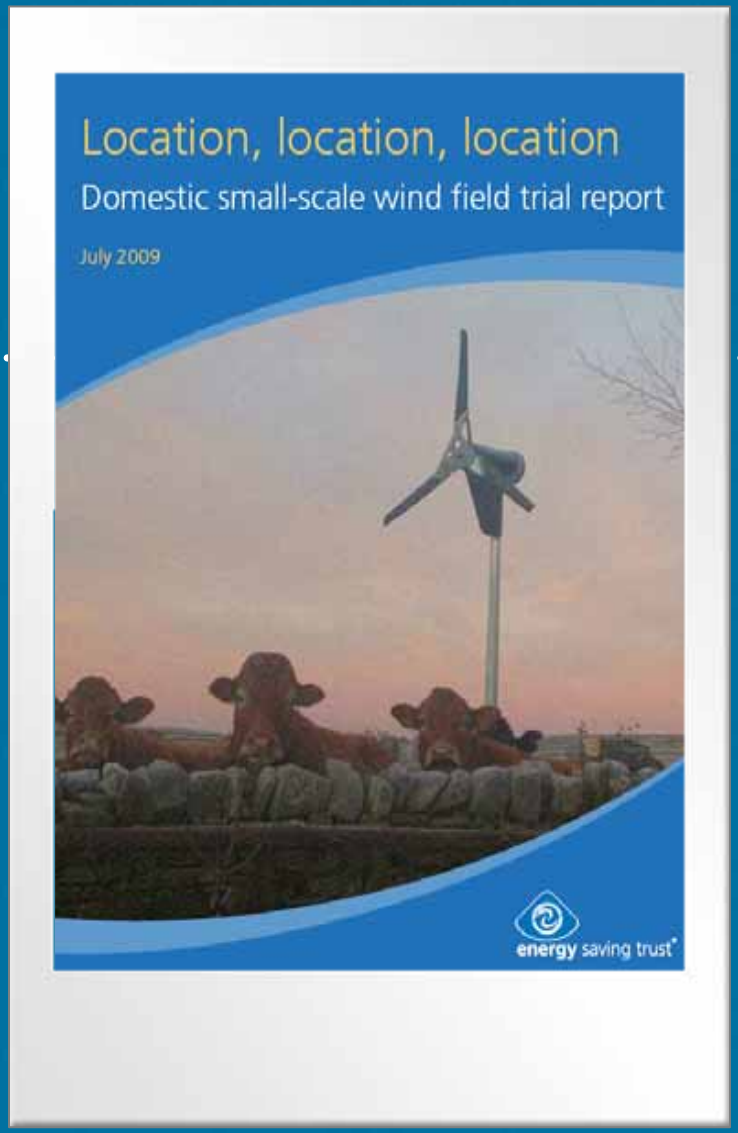

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